

LOW PHASE-NOISE LOCAL OSCILLATOR AND METHOD

Abstract of the Disclosure

5 An oscillator to generate a low phase-noise reference signal at an
oscillation frequency includes a frequency generator to generate the reference
signal responsive to a control signal, and a delay element made of a high-
temperature superconductor material. The delay element time-delays the reference
signal and provides a low phase-noise time-delayed reference signal when cooled
10 to a cryogenic temperature. The oscillator includes a phase detector to generate the
control signal from a phase difference between the time-delayed reference signal
and a phase-shifted reference signal. The delay element may comprise a coplanar
waveguide having a length between 500 and 1000 meters arranged randomly on a
substrate having a diameter of between five and thirteen centimeters. The delay
15 element may provide a delay ranging from five to fifteen microseconds. The
coplanar waveguide may be comprised of Yttrium-Barium-Copper Oxide
disposed on either a Lanthanum-Aluminum Oxide or a Magnesium Oxide
substrate.